FILE

COMPLIANCE PLAN
SEMI-ANNUAL REPORT

JULY 1 THROUGH
DECEMBER 31, 1996

TerraNext

Terranext 6200 Rothway, Suite 190 Houston, TX 77040

FILE

January 20, 1997

Mr. Dan Pearson
Executive Director
Permits Section (MC 130)
Texas Natural Resource Conservation Commission
P.O. Box 13087
Austin, Texas 78711-3087

Re: Former Southern Pacific Transportation Company (SPTCo)
Union Pacific Railroad Company
4910 Liberty Road Facility, Houston
Post-Closure Care Permit No. HW-50343-000
Industrial Solid Waste Registration No. 31457
EPA ID No. TXD000820266
Compliance Plan No. CP-50343
Semi-annual Report: July 1 through December 31, 1996

Dear Mr. Pearson:

Terranext is pleased to provide the enclosed Semi-annual Report for the above-referenced facility on behalf of Union Pacific Railroad Company (UP). This report presents a summary of activities conducted for the referenced facility performed as part of the post-closure care and is submitted in accordance with Provision VII.B.2 of the Compliance Plan. The designated reporting period includes July 1 through December 31, 1996.

Further correspondence regarding this report or this project should be directed to: Mr. Ed Honig, Manager Environmental Site Remediation, Union Pacific Railroad Company; 1416 Dodge Street; Omaha, Nebraska; 68179. You may contact Mr. Honig via telephone at (402) 271-5979 if you have any questions.

Sincerely,

TERRANEXT

Robert E Cox – for

Curtis L. Jones
Senior Project Manager

Enclosure
Distribution: per Attachment

/u/proj/sp/2069/tnrcc120.ltr

FILE

HOUSTON WOOD PRESERVING WORKS
COMPLIANCE PLAN NO. CP-50343

Distribution List

Ms. Marsha Hill, Program Manager Hazardous & Solid Waste Program Region 12	TNRCC 5425 Polk Ave., Suite H Houston, Texas 77023
Dr. Ata-ur-Rahman Permits Ground Water Team Supervisor (MC130) Mr. Steve Omo, Permits Section (Letter) (MC130) Industrial & Hazardous Waste Division Ms. Cyndi Garrigan, Corrective Action (Letter) (MC127) Industrial & Hazardous Waste Division	TNRCC 12100 Park 35 Circle Building A, Room 122 Austin, Texas 78753
Dr. Allyn M. Davis Director, Hazardous Waste Management	U.S. EPA, Region VI 1445 Ross Avenue, Suite 700 Dallas, Texas 75202-2733
Ms. Laurie Cahill (Letter) Holme Roberts & Owen	Attorneys at Law 1700 Lincoln, Suite 4100 Denver, Colorado 80203
Mr. Curt Jones Manager, Midwest Operations	Terranext 8101 College Blvd., Suite 230 Overland Park, Kansas 66210
Mr. Steven Lange VP - Senior Technical Advisor	Terranext 165 S. Union Blvd., Suite 1000 Lakewood, Colorado 80228
Dr. Devraj Sharma VP - Director of Science and Development	Terranext Principia Mathematica Division 165 S. Union Blvd., Suite 1000 Lakewood, Colorado 80228
Mr. Greg F. Shepherd Sr. Environmental Project Manager	Union Pacific Railroad Company One Market Plaza San Francisco, California 94105
Project File	Terranext 6200 Rothway, Ste 190 Houston, Texas 77040
Operating Record File	Southern Pacific Lines c/o Tim O'Brien 913 Franklin, Room 712 Houston, Texas 77002

COMPLIANCE PLAN
SEMI-ANNUAL REPORT
JULY 1 THROUGH DECEMBER 31, 1996

Union Pacific Railroad Company
Formerly Southern Pacific Transportation Company
Wood Preserving Works
4910 Liberty Road
Houston, Texas

Terranext Project No. 44102069.05

Prepared For:

Union Pacific Railroad Company
Formerly Southern Pacific Lines
One Market Plaza
San Francisco, California 94105

January 20, 1997

Terranext

COMPLIANCE PLAN
SEMI-ANNUAL REPORT
JULY 1 THROUGH DECEMBER 31, 1996

Union Pacific Railroad Company
Formerly Southern Pacific Transportation Company
Wood Preserving Works
4910 Liberty Road
Houston, Texas

Prepared By:

William R. Goldsby → al JS

William R. Goldsby
Geologist III

Reviewed By:

Robert Cox - for

Steven Lange
Technical Manager

TerraNext

TABLE OF CONTENTS

FIGURES

TABLE OF CONTENTS (continued)

TABLES

APPENDICES

1.0 INTRODUCTION

1.1 Purpose

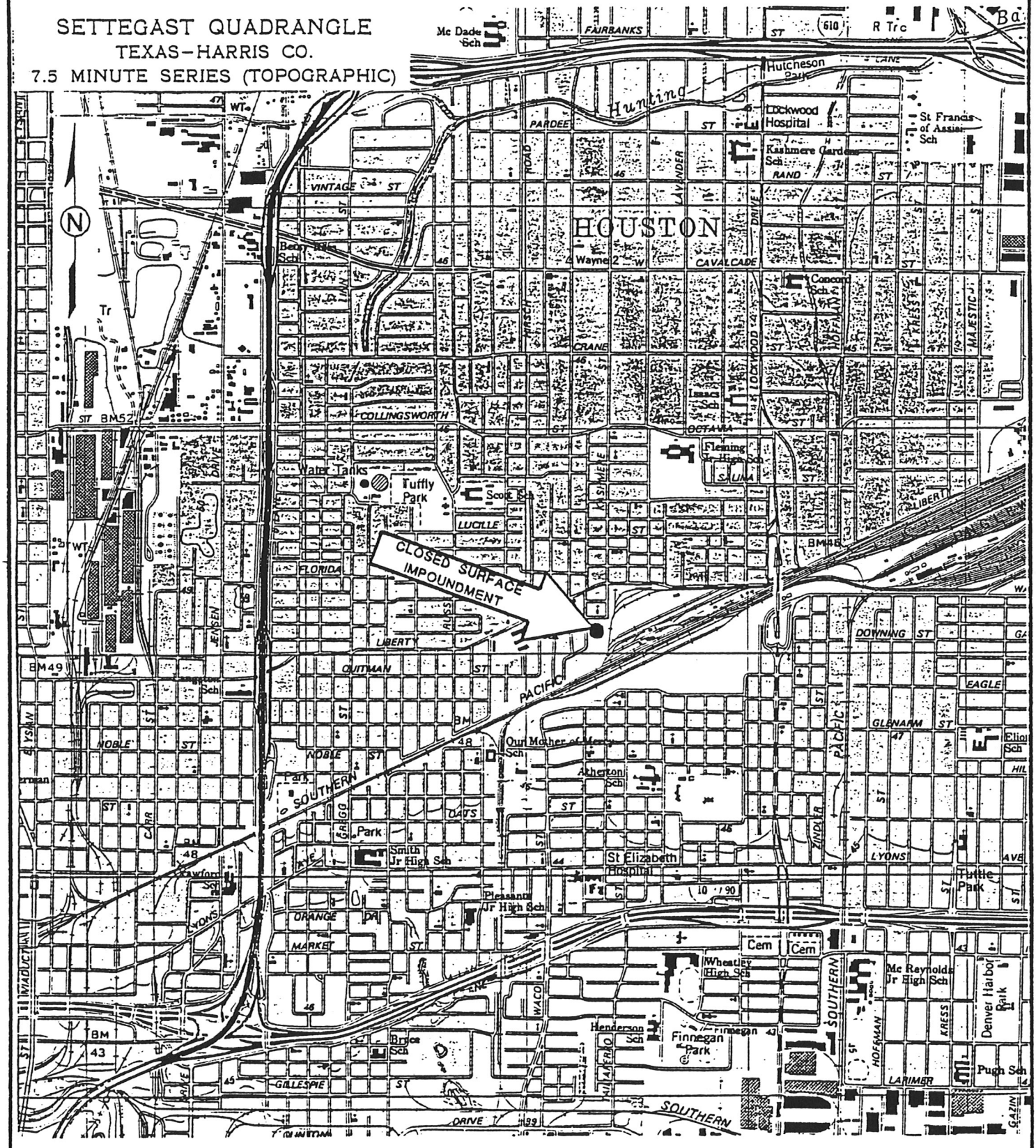
On June 20, 1994, the Texas Natural Resource Conservation Commission (TNRCC) issued Permit Number HW-50343-000 (hereinafter, Permit) and TNRCC Compliance Plan Number CP-50343, which is incorporated within the Permit. The Permit applies to post-closure care for one former surface impoundment (TNRCC Permit Unit No. II.B.1) located at the Southern Pacific Transportation Company (SPTCo) former Houston Wood Preserving Works (HWPW), 4910 Liberty Road, Houston, Texas (Figure 1). In September 1996, the site became the property of the Union Pacific Railroad Company (UP). The Permit requires a RCRA Facility Investigation (RFI), and the Compliance Plan (CP) requires an Extent of Contamination (EOC) Investigation; the EOC Work Plan dated September 16, 1994, and the RFI Work Plan dated October 14, 1994, were approved respectively by letters from the TNRCC dated September 29 and October 16, 1995. Phase 1 Investigation activities outlined in the approved EOC and RFI Work Plans were initiated in October 1995. SPTCO submitted the Phase 1 RFI/EOC Investigation Report to the TNRCC on May 23, 1996. This Semi-Annual Report (SAR) was prepared to comply with the requirements of CP Provision VII.B.2. All referenced figures and tables are presented at the end of each major report section.

The activity period covered by this report is designated in CP Provision VII.B.2.a and encompasses July 1 through December 31, 1996, as the preceding six-month period.

1.2 Applicability and Scope

Provisions VII.B.2.a through VII.B.2.m of the Compliance Plan require that this SAR include the following:

SETTEGAST QUADRANGLE
TEXAS–HARRIS CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



PROJ.#44102069	PAGE#
SCALE: 1" =60'	DRAWN BY: S.H.
FILE NO. 2069.DWG	DESIGNED BY: E.H.
DATE: 1-15-96	APPROVED BY: E.H.

Terranext

FIGURE 1
SITE VICINITY MAP
SOUTHERN PACIFIC TRANSPORTATION COMPANY
WOOD PRESERVING WORKS
4910 LIBERTY ROAD
HOUSTON, TEXAS

a. Narrative summary of the evaluations made in accordance with Sections V, VI, and VII with regard to corrective action and ground water monitoring.

b. Tabulated chemical analyses indicating each parameter that exceeds the Ground Water Protection Standard (CP Table I, Appendix A).

c. Tabulated water level elevations (relative to mean sea level), depth to water measurements, and total depth of well measurements.

d. Potentiometric surface maps of water table elevation during sampling events.

e. If a recovery system is installed, potentiometric surface maps indicating radius of influence, hydraulic gradients, and regional ground water flow.

f. Tabulation of the depth and thickness of non-aqueous phase liquids (NAPLs), if present, in each well for each sampling event performed during the period.

g. If a recovery system is installed, tabulation of monthly quantities of recovered ground water and NAPLs, if encountered, and graphs of weekly recorded flow rates versus time for Recovery Wells during each quarter.

h. Tabulation of data evaluation results and status of compliance of each well of CP Table III (Appendix B) with respect to the Ground Water Protection Standards.

i. Isopleth contour maps of naphthalene; acenaphthene; and the sum of benzene, toluene, ethylbenzene, and total xylenes (BTEX) concentrations.

j. Updated schedule summary per CP Provision XI.A.

k. Summary of any changes made to the monitoring/corrective action program and summary of Recovery Well inspections, repairs, and any operational difficulties.

l. Recommendation for any changes.

m. Any other items requested by the Executive Director.

A recovery system has not been installed for this facility. Therefore, Items e, g, and k (as each relates to Recovery Wells) will not be addressed further in this SAR. All other items as listed above are addressed in the text summary in Section 2.0 of the SAR, with supporting figures and tables presented at the end of Section 2.0. Reference information is presented in the appendices.

2.0 REPORT ITEMS

2.1 Corrective Action and Ground Water Monitoring Summary

2.1.1 Corrective Action System

Existing wells were sampled and monitored to evaluate the extent of ground water contamination in the Uppermost Transmissive Zone (UTZ) and the Second Transmissive Zone (STZ). The definition of the UTZ and STZ is consistent with CP Provision I.A:

* UTZ refers to the first sand unit encountered at approximately 35 feet above mean sea level (MSL), averaging 6 to 8 feet in thickness.

* STZ refers to the second sand unit encountered at approximately 15 feet MSL, averaging 8 to 10 feet in thickness.

Existing monitoring wells in the UTZ, designated by function consistent with CP Table III, include Corrective Action Observation (CAO) wells (MW-4, -5, -7, -8, and -9) and Point of Compliance (POC) wells (MW-1a, -2, -7, -10a, and -11a). Existing wells in the STZ include POC wells (MW-10b and MW-11b) and piezometers (P-10, -11, and -12) (Appendix A).

2.1.2 Ground Water Monitoring

Monitor wells and piezometers, shown in Figure 2 (page 11), were sampled on September 17 and 18, 1996 as the second semi-annual monitoring event in 1996. The schedule for ground

water monitoring was changed from quarterly to semi-annual beginning with the July 1995 event, as provided by Provision VI.C.3 of the Compliance Plan.

Ten ground water monitor wells (MW-1a, MW-2, MW-3, MW-4, MW-5, MW-7, MW-8, MW-9, MW-10a, and MW-11a) completed in the UTZ (El +35-foot zone) and two monitor wells (MW-10b and MW-11b) and three piezometers (P-10, P-11, and P-12) completed in the STZ (El +15-foot zone) were sampled during the second semi-annual period 1996. Field tracking reports and ground water sampling forms from the second semi-annual sampling event in 1996 are provided in Appendix B.

2.2 Analytical Data

The ground water analytical data for the second semi-annual sampling event are listed in Tables 1 and 2 (page 20 and 21); results are tabulated for the UTZ and STZ. Detected concentrations of analytes in excess of the Ground Water Protection Standard (Appendix C) are indicated by shading on these tables.

2.3 Water Level Elevations

Table 3 lists the total depth, casing reference elevation, measured depth to water, and calculated water level elevation relative to mean sea level for each monitor well and piezometer.

2.4 Potentiometric Surface Data

Terranext used the measured ground water elevations to prepare a potentiometric map of each ground water zone. The equipotential lines were determined by applying a linear

kriging algorithm to the data. Flow vectors were calculated based on the calculate head distribution and an estimated porosity of 30 percent.

Figure 3 (page 12), depicts the potentiometric surface map of water table elevations for the UTZ during the second semi-annual monitoring event. Figure 4 (page 13), depicts the piezometric surface for the STZ during the second semi-annual monitoring event, showing the elevations to which ground water in the STZ rises when hydrostatic pressure is released.

The gradient for UTZ is calculated to be 0.005 ft/ft to the west-northwest. The gradient for the STZ is calculated to be 0.005 ft/ft to the west.

2.5 Non-Aqueous Phase Liquids

No light or dense non-aqueous phase liquids (NAPLs) were noted within any of the monitor wells or piezometers during the second semi-annual monitoring event.

2.6 Analytical Data Evaluation

Compliance Plan Provision VI.D provides two options for data evaluation: direct comparison with the concentration limits for the Ground Water Protection Standard or statistical analysis of the data. Table 4 (page 23) lists the results of direct comparison of the analytical data for the second semi-annual sampling event with the Ground Water Protection Standard and specifications of CP Provision VI.D.1. Wells and piezometers are considered compliant with the Ground Water Protection Standard if all constituents of concern were detected at concentrations less than or equal to the respective practical quantitation concentration limit. Wells and piezometers are considered noncompliant if one or more constituents of concern were detected at a concentration greater than the respective concentration limit.

2.7 Naphthalene, Acenaphthene, and BTEX Concentrations

The concentrations of the selected analytes as determined by the analytical laboratory have been plotted and then contoured. The contour lines were plotted using a log normal kriging technique. Locations with reported non-detects were assigned a value equal to one half of the reported laboratory detection limit.

The naphthalene, acenaphthene, and combined total BTEX concentrations determined during the second semi-annual sampling event are illustrated in Figures 5 through 7, for the UTZ, and Figures 8 through 10 for the STZ, respectively.

2.8 Updated Compliance Plan Schedule

The Schedule for Compliance Plan Activities as required by CP Provision XI.A., submitted by SPTCo on August 19, 1994, was approved the TNRCC by letter dated, November 3, 1994. TNRCC recognized the dates and time-lines for the required activities to be correct and in accordance with the Compliance Plan. The revised (Semi-annual) schedule submitted with this report in Appendix D includes an estimated schedule for completion of RCRA Facility Investigation tasks required by the Permit.

Time frames, dates, and/or deadlines that were not specified in the Compliance Plan for required activities have been assumed based upon the estimated level of effort to complete the tasks. In some instances, the period for regulatory review was estimated to be 30 days from submittal date of the deliverable. Where unspecified in the Compliance Plan, the period of time for revisions to deliverables was assumed to be 60 days.

The EOC Work Plan dated September 16, 1994, was prepared as required under CP Provisions VIII and XI.D. In response to the TNRCC letter of April 11, 1995, the EOC

Work Plan and implementation schedule were amended and submitted to the TNRCC on May 19, 1995. In the TNRCC EOC Work Plan approval letter, dated September 29, 1995, the TNRCC requested a revised schedule corresponding to the date of initiation of the investigation; the revised schedule was submitted on November 22, 1995. The latest updated schedule is presented in Appendix D, and incorporates ongoing investigation activities and revisions to reflect actual dates of task completion and anticipated start dates for upcoming events.

The EOC Investigation Report required by CP Provisions VIII.E and IX was submitted to TNRCC as a component of the Phase 1 RFI/EOC Investigation Report, dated May 23, 1996. The schedule included herein provides for semi-annual ground water monitoring to continue at the closed impoundment. Phase 2 of the EOC Investigation will focus on the area south and southwest of the permitted unit to determine what impact the South Drainage Ditch, Solid Waste Management Unit (SWMU) 2, the Inactive Wastewater Lagoon Area of Concern (AOC) 6, and possible on-site sources may have on ground water quality in the vicinity of the permitted unit.

The Corrective Action Study Work Plan is required by CP Provision IX within 60 days of TNRCC approval of the EOC Investigation Report. The EOC Investigation Report will be submitted as a component of the Phase 2 RFI/EOC Investigation Report. The Corrective Action Study may involve treatability or pilot studies for which time frames are currently uncertain. Similarly, the schedule for the corrective action phase of the project is uncertain due to existing data gaps and the need for subsequent technical and regulatory evaluation of the findings of the proposed investigation, including evaluation of risk-based cleanup standards. The Corrective Action Report is now anticipated to be approved in June 1999.

2.9 Monitoring/Corrective Action Program Changes and Inspections

By letter of January 10, 1995, the TNRCC acknowledged fulfillment of the requirement of CP Provision XI.B by the Operation & Maintenance (O&M) Plan dated August 19, 1994, together with the addendum to the O&M Plan dated December 8, 1994. By letter of October 13, 1995, the TNRCC approved O&M Plan Amendment 3, which included quarterly monitor well inspections.

Integrity of the well casings and siltation of the wells were evaluated during the September 1996 sampling event in accordance with CP Provision VI.C.4.e. Monitor wells and piezometers were also inspected in December 1996.

POC and CAO wells and the piezometers were monitored on a quarterly basis to provide four quarters of baseline data through July 1995. Consistent with CP Provisions VI.C.3.a and VI.C.3.e, the POC wells and the CAO wells will be sampled and analyzed for the constituents of CP Table II (Appendix E) on a semi-annual basis which began in July 1995.

2.10 Recommendation for Any Changes

No changes in the monitoring/corrective action program are recommended at this time, pending approval and implementation of proposed Phase 2 of the RFI/EOC Investigation as presented in the Phase 1 RFI/EOC Investigation Report.

2.11 Other Items Requested by the Executive Director

No other items have been requested by the Executive Director of the TNRCC.

Monitoring Wells and Piezometers

SPTCo: Houston Wood Preserving Works Site

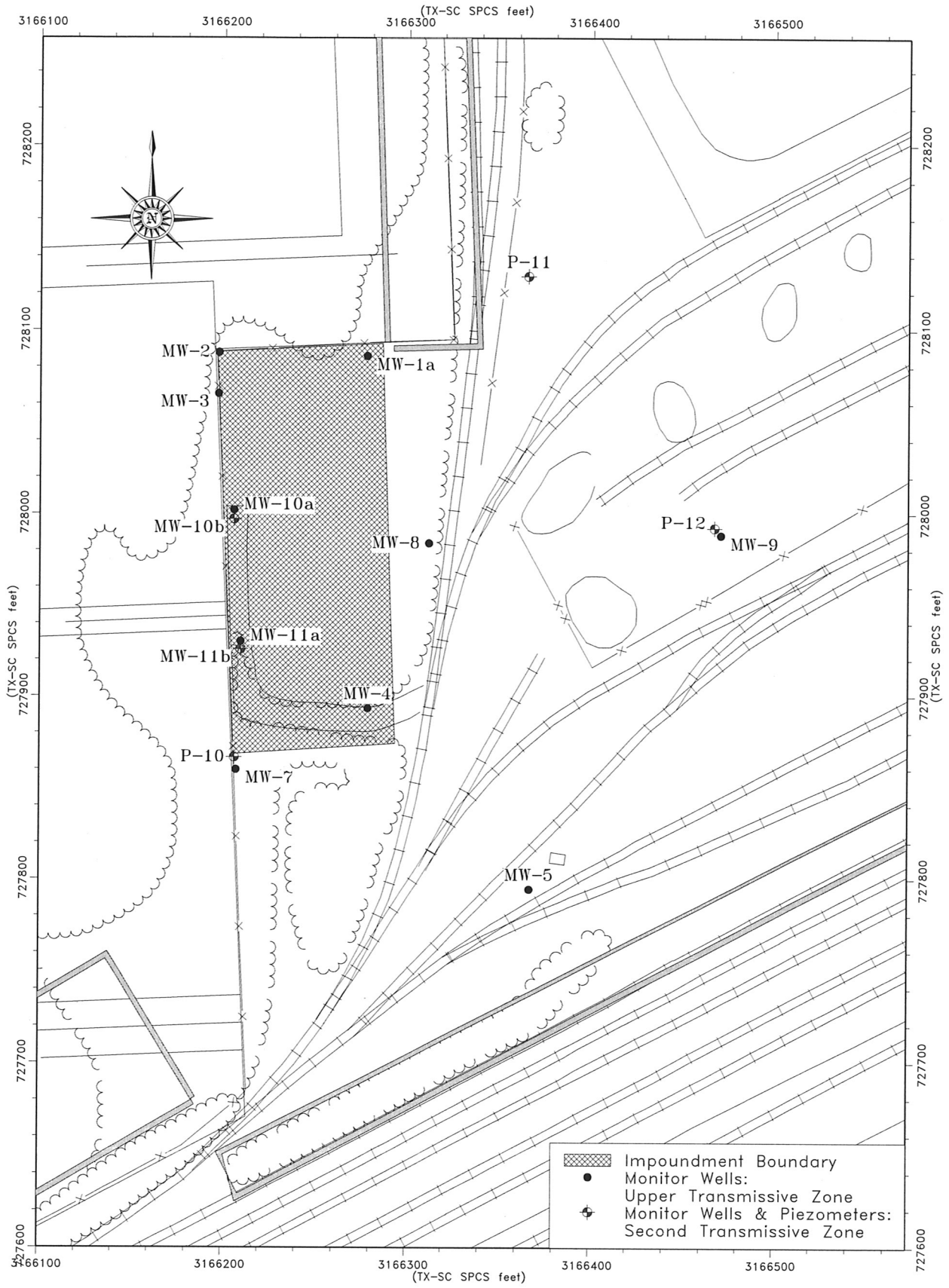


Figure 2. Monitoring Wells and Piezometers

Potentiometric Surface: Upper Transmissive Zone; 09/17/96

SPTCo: Houston Wood Preserving Works Site

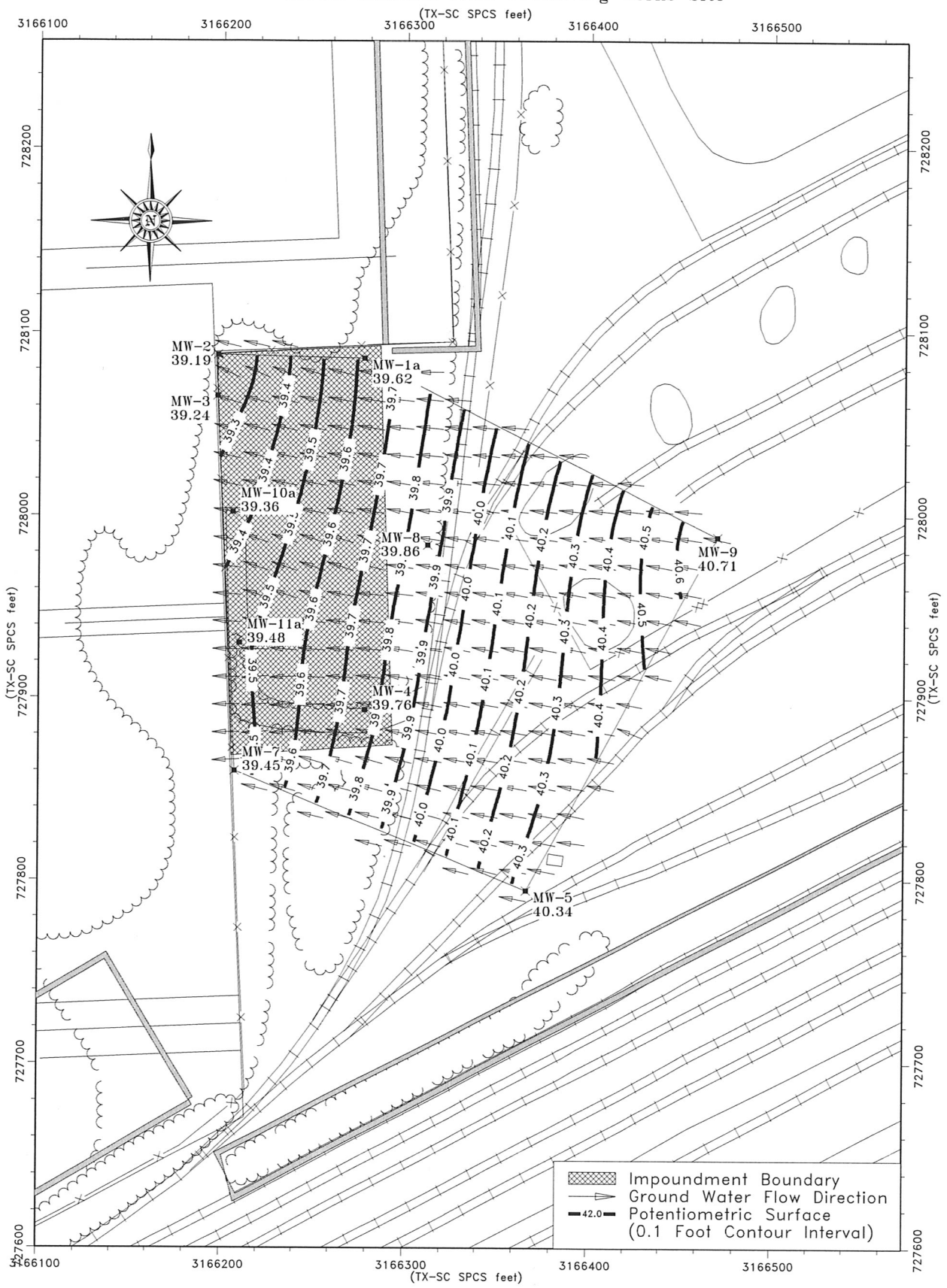


Figure 3. Potentiometric Surface: Upper Transmissive Zone; 09/17/96

Piezometric Surface: Second Transmissive Zone; 09/17/96

SPTCo: Houston Wood Preserving Works Site

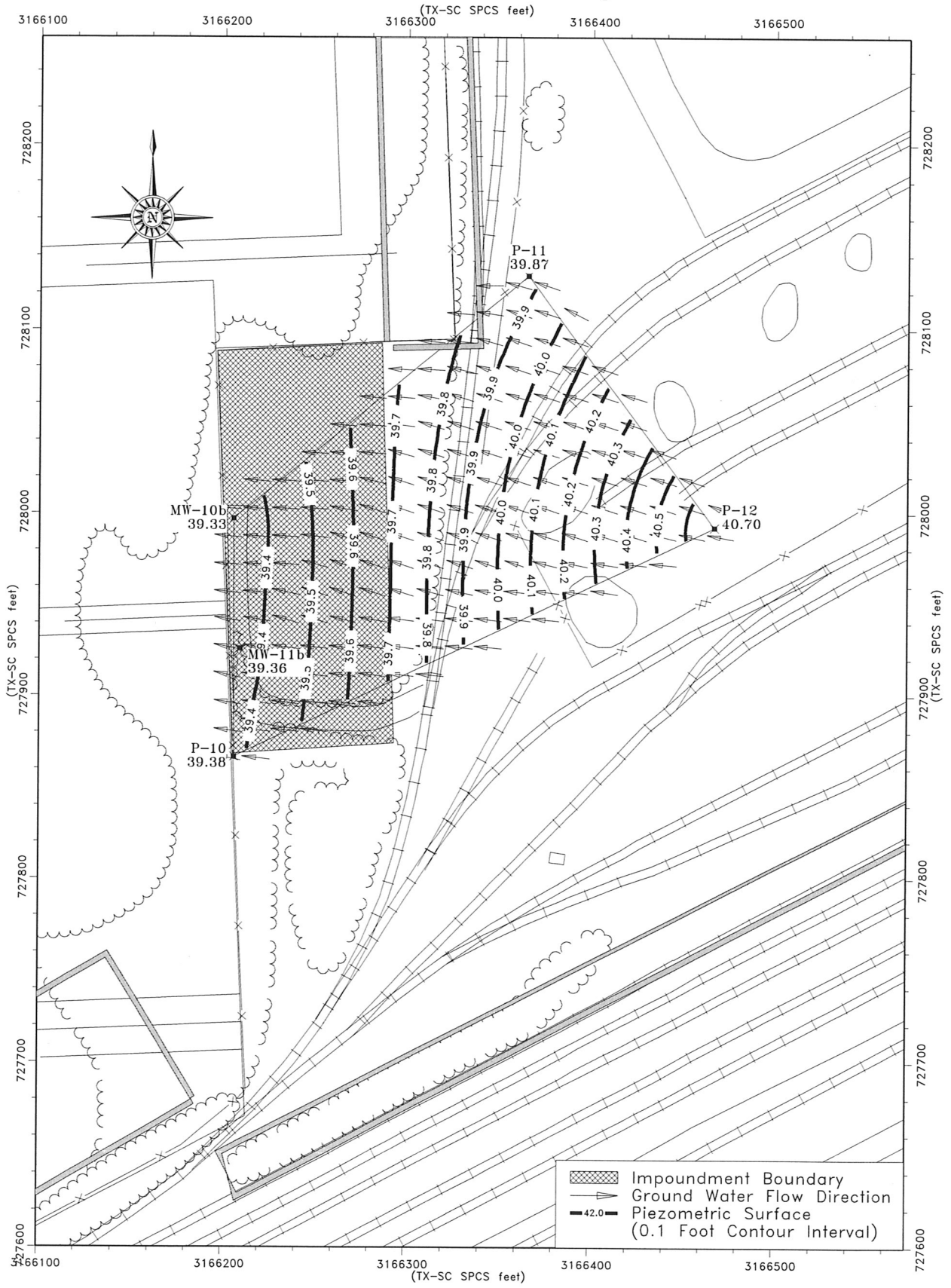


Figure 4. Piezometric Surface: Second Transmissive Zone; 09/17/96

Interpretation of Naphthalene: Upper Transmissive Zone; 09/17/96

SPTCo: Houston Wood Preserving Works Site

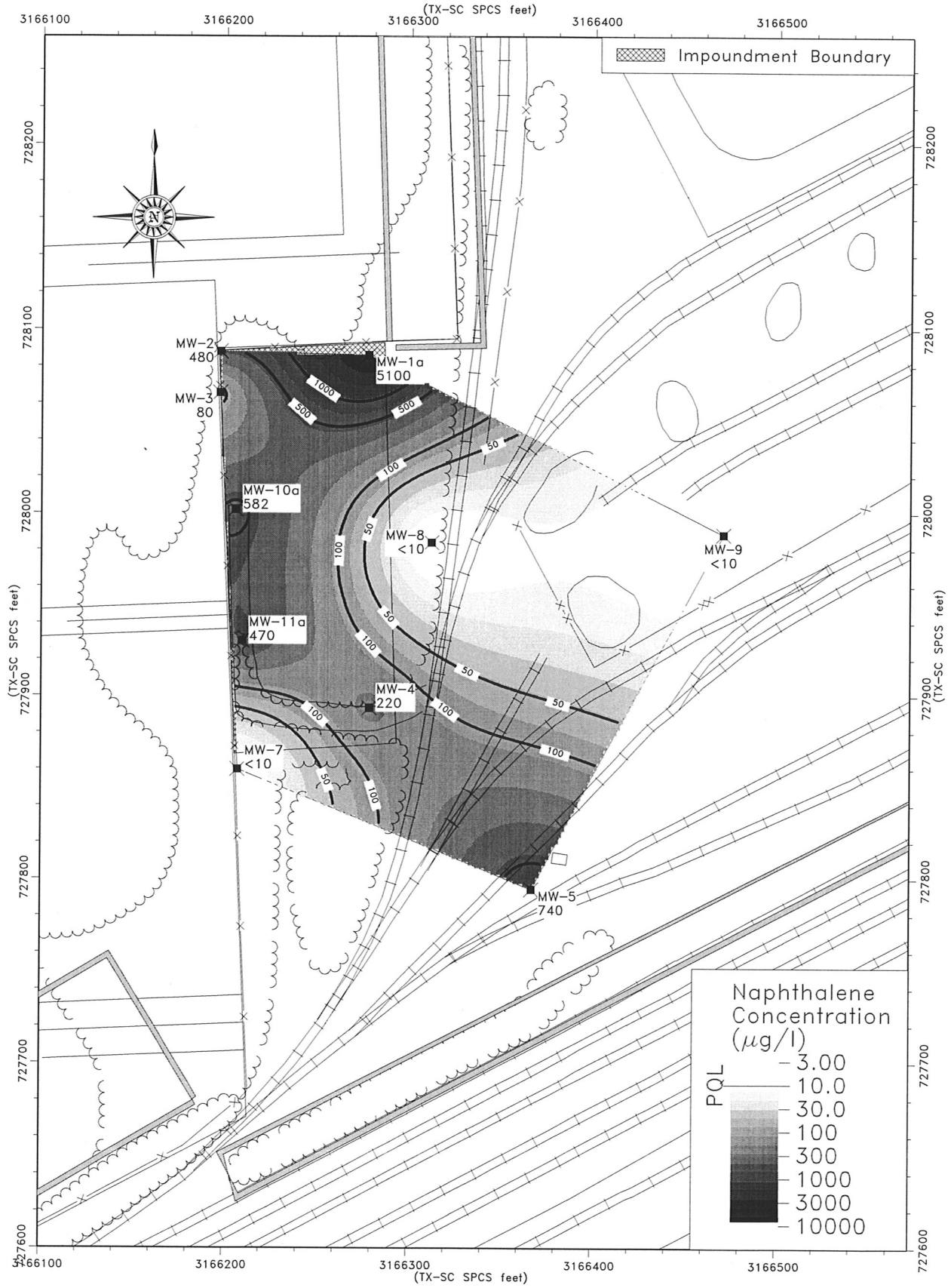


Figure 5. Interpretation of Naphthalene: Upper Transmissive Zone; 09/17/96

Interpretation of Acenaphthene: Upper Transmissive Zone; 09/17/96

SPTCo: Houston Wood Preserving Works Site

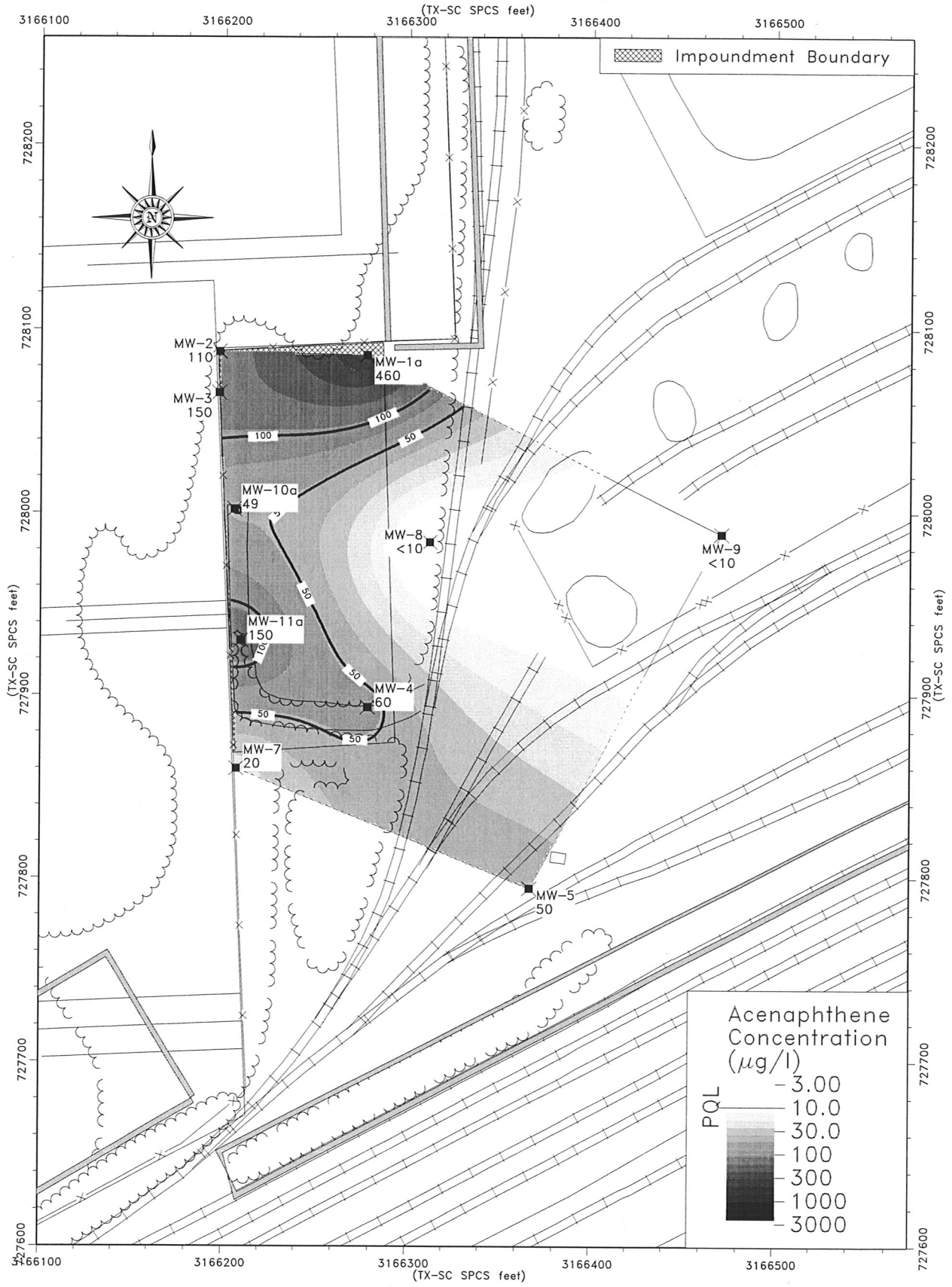


Figure 6. Interpretation of Acenaphthene: Upper Transmissive Zone; 09/17/96

Interpretation of Total BTEX: Upper Transmissive Zone; 09/17/96

SPTCo: Houston Wood Preserving Works Site

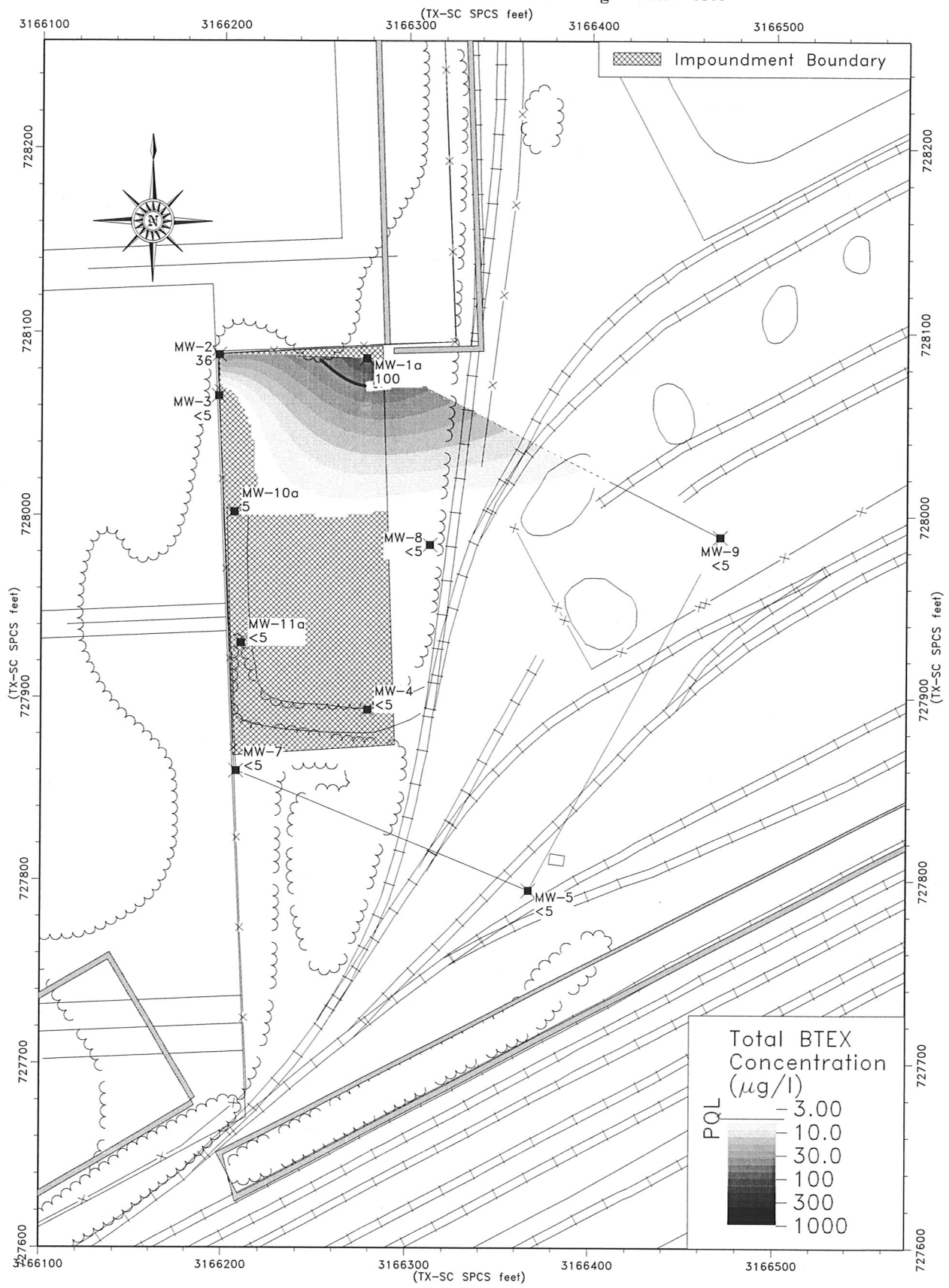


Figure 7. Interpretation of Total BTEX: Upper Transmissive Zone; 09/17/96

Interpretation of Naphthalene: Second Transmissive Zone; 09/17/96

SPTCo: Houston Wood Preserving Works Site

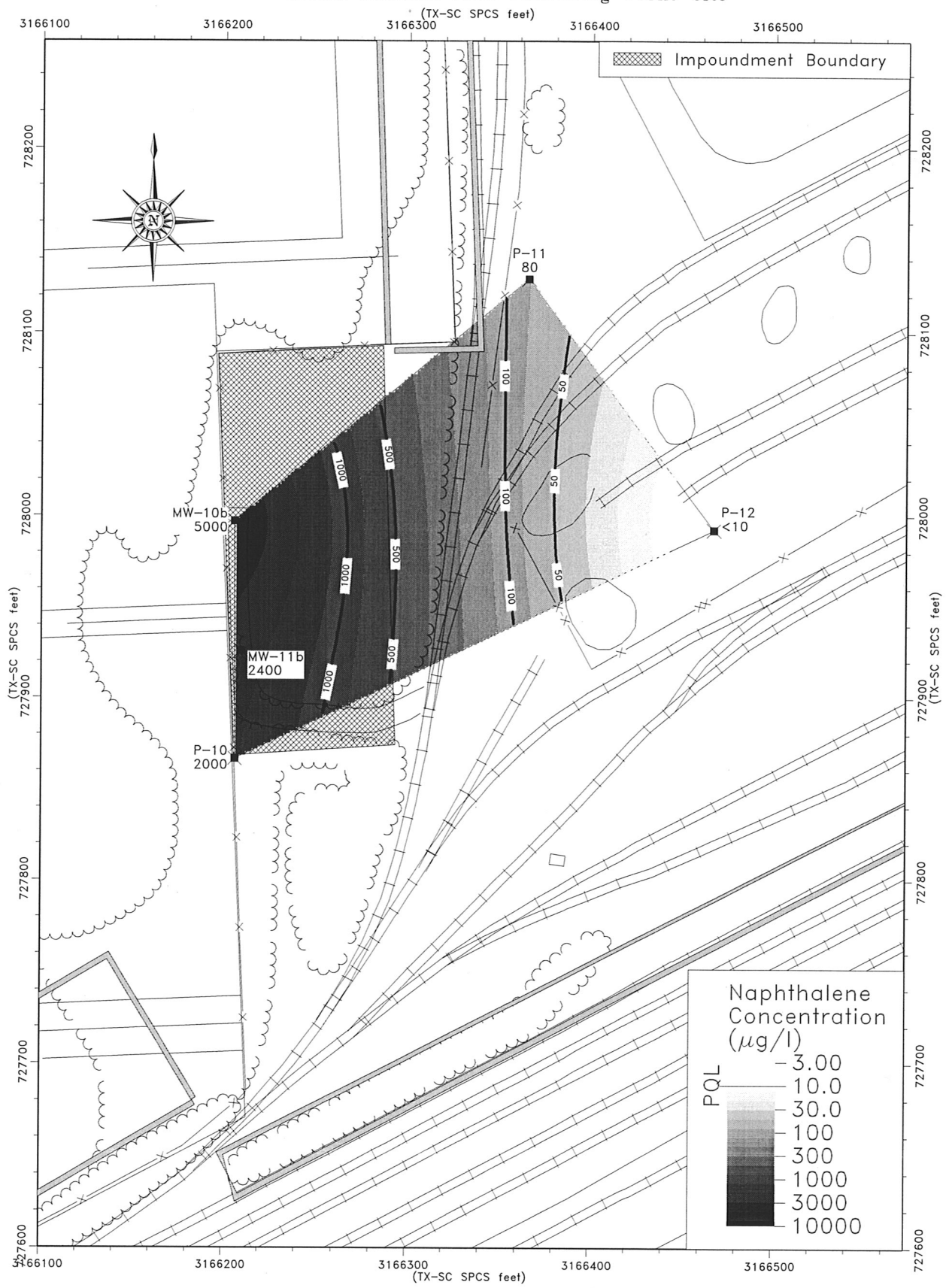


Figure 8. Interpretation of Naphthalene: Second Transmissive Zone; 09/17/96

Interpretation of Acenaphthene: Second Transmissive Zone; 09/17/96

SPTCo: Houston Wood Preserving Works Site

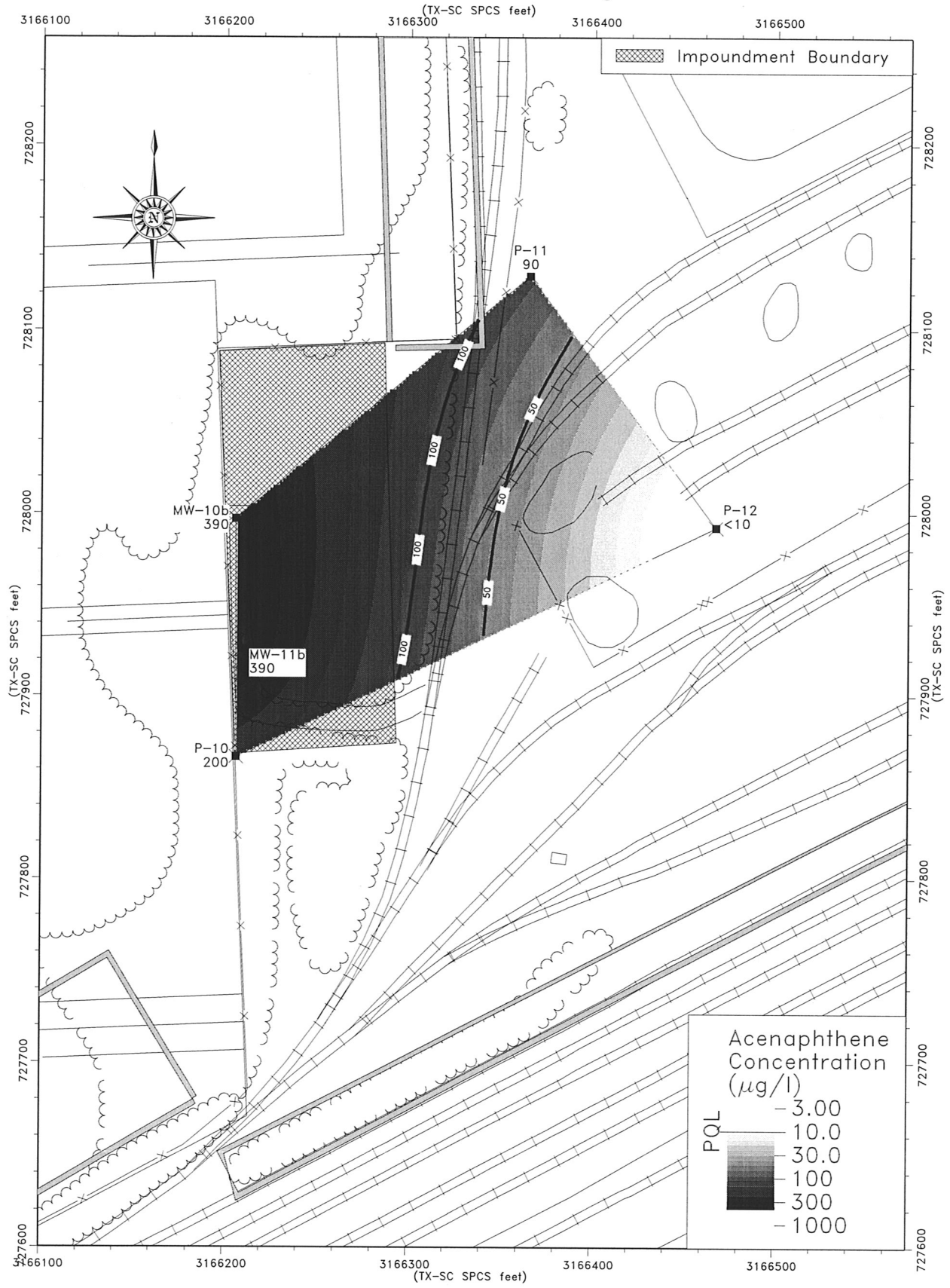


Figure 9. Interpretation of Acenaphthene: Second Transmissive Zone; 09/17/96

Interpretation of Total BTEX: Second Transmissive Zone; 09/17/96

SPTCo: Houston Wood Preserving Works Site

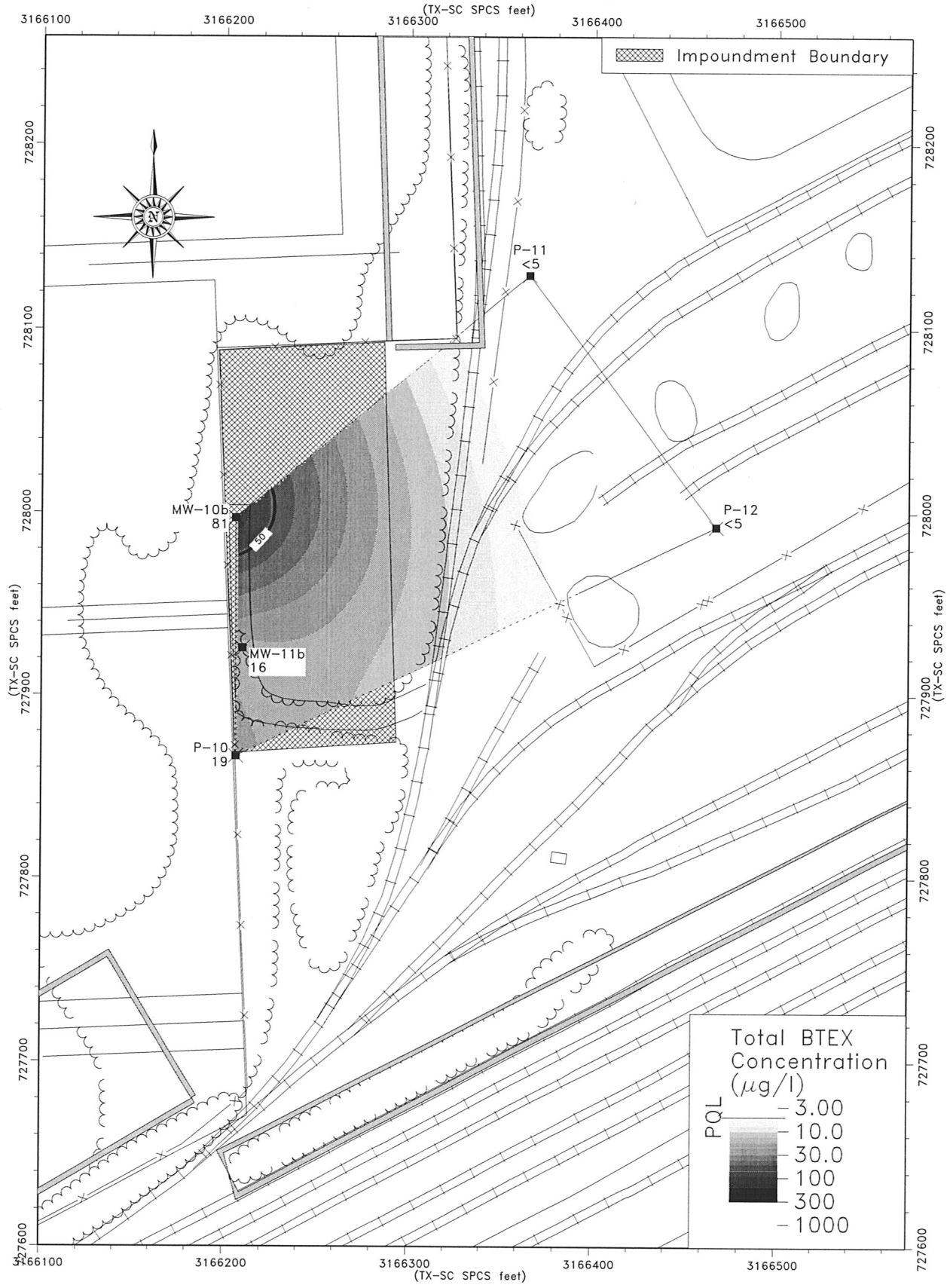


Figure 10. Interpretation of Total BTEX: Second Transmissive Zone; 09/17/96

TABLE 1
SUMMARY OF ANALYTICAL RESULTS FOR UTZ
(El +35-FOOT SAND ZONE) MONITOR WELLS
Second Semi-annual Event 1996

	ANALYTICAL RESULTS (µg/L)									
COMPOUND	MW-1a	MW-2	MW-3	MW-4	MW-5	MW-7	MW-8	MW-9	MW-10a	MW-11a
BENZENE	9	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5
CHLOROBENZENE	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5
1,2-DICHLOROETHANE	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5
DICHLOROMETHANE	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5
ETHYLBENZENE	31	12	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5
TOLUENE	12	7	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5
XYLENES	48	17	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	5	ND<5
ACENAPHTHENE	460	110	150	60	50	20	ND<10	ND<10	49	150
ACENAPHTHYLENE	10	ND<10	ND<10	ND<10	20	ND<10	ND<10	ND<10	ND<10	ND<10
ANTHRACENE	30	ND<10	10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10
BENZO(A)ANTHRACENE	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10
BENZO(A)PYRENE	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10
BIS(2-ETHYLHEXYL)PHTHALATE	ND<10	ND<10	ND<10	20	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10
BIS(2-CHLOROETHOXY)METHANE	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10
2-CHLORONAPHTHALENE	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10
CHRYSENE	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10
DIBENZOFURAN	240	80	110	30	20	ND<10	ND<10	ND<10	19	70
2,4-DIMETHYLPHENOL	20	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10
DI-N-BUTYL PHTHALATE	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10
4,6-DINITRO-O-CRESOL	ND<50	ND<50	ND<50	ND<50	ND<50	ND<50	ND<50	ND<50	ND<50	ND<50
2,4-DINITROTOLUENE	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10
2,6-DINITROTOLUENE	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10
1,2-D3IPHENYLHYDRAZINE	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10
FLUORANTHENE	20	ND<10	20	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	10
FLUORENE	280	70	110	40	20	ND<10	ND<10	ND<10	20	80
2-METHYLNAPHTHALENE	670	ND<10	ND<10	20	20	ND<10	ND<10	ND<10	24	60
NAPHTHALENE	101	478	79	224	736	ND<10	ND<10	ND<10	582	468
NITROBENZENE	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10
4-NITROPHENOL	ND<50	ND<50	ND<50	ND<50	ND<50	ND<50	ND<50	ND<50	ND<50	ND<50
N-NITROSODIPHENYLAMINE	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10
PENTACHLOROPHENOL	ND<50	ND<50	ND<50	ND<50	ND<50	ND<50	ND<50	ND<50	ND<50	ND<50
PHENANTHRENE	140	10	50	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	40
PHENOL	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10
PYRENE	ND<10	ND<10	10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10

µg/L = micrograms per liter
ND = Not Detected at given detection limit

TerraNext

TABLE 2
SUMMARY OF ANALYTICAL RESULTS FOR STZ
(El +15-FOOT SAND ZONE) MONITOR WELLS AND PIEZOMETERS
Second Semi-annual Event 1996

ANALYTICAL RESULTS (µg/L)					
COMPOUND	P-10	P-11	P-12	MW-10b	MW-11b
BENZENE	ND<5	ND<5	ND<5	5.9	ND<5
CHLOROBENZENE	ND<5	ND<5	ND<5	ND<5	ND<5
1,2-DICHLOROETHANE	ND<5	ND<5	ND<5	ND<5	ND<5
DICHLOROMETHANE	ND<5	ND<5	ND<5	ND<5	ND<5
ETHYLBENZENE	11	ND<5	ND<5	56	13
TOLUENE	ND<5	ND<5	ND<5	25	ND<5
XYLENES	7.5	ND<5	ND<5	130	15
ACENAPHTHENE	190	62	ND<10	330	340
ACENAPHTHYLENE	ND<10	ND<10	ND<10	ND<10	ND<10
ANTHRACENE	11	ND<10	ND<10	17	28
BENZO(A)ANTHRACENE	ND<10	ND<10	ND<10	ND<10	ND<10
BENZO(A)PYRENE	ND<10	ND<10	ND<10	ND<10	ND<10
BIS(2-ETHYLHEXYL)PHTHALATE	ND<10	ND<10	ND<10	ND<10	ND<10
BIS(2-CHLOROETHOXY)METHANE	ND<10	ND<10	ND<10	ND<10	ND<10
2-CHLORONAPHTHALENE	ND<10	ND<10	ND<10	ND<10	ND<10
CHRYSENE	ND<10	ND<10	ND<10	ND<10	ND<10
DIBENZOFURAN	23	59	ND<10	200	260
2,4-DIMETHYLPHENOL	ND<10	ND<10	ND<10	ND<10	ND<10
DI-N-BUTYL PHTHALATE	ND<10	ND<10	ND<10	ND<10	ND<10
4,6-DINITRO-O-CRESOL	ND<50	ND<50	ND<50	ND<50	ND<50
2,4-DINITROTOLUENE	ND<10	ND<10	ND<10	ND<10	ND<10
2,6-DINITROTOLUENE	ND<10	ND<10	ND<10	ND<10	ND<10
1,2-DIPHENYLHYDRAZINE	ND<10	ND<10	ND<10	ND<10	ND<10
FLUORANTHENE	ND<10	ND<10	ND<10	10	21
FLUORENE	83	49	ND<10	210	250
2-METHYLNAPHTHALENE	87	ND<10	ND<10	400	250
NAPHTHALENE	1100	150	ND<10	2800	1500
NITROBENZENE	ND<10	ND<10	ND<10	ND<10	ND<10
4-NITROPHENOL	ND<50	ND<50	ND<50	ND<50	ND<50
N-NITROSODIPHENYLAMINE	ND<10	ND<10	ND<10	ND<10	ND<10
PENTACHLOROPHENOL	ND<50	ND<50	ND<50	ND<50	ND<50
PHENANTHRENE	53	15	ND<10	110	250
PHENOL	ND<10	ND<10	ND<10	ND<10	ND<10
PYRENE	ND<10	ND<10	ND<10	ND<10	ND<10

µg/L = micrograms per liter
ND = Not Detected at given detection limit

TerraNext

TABLE 3
WATER LEVEL ELEVATIONS
SECOND SEMI-ANNUAL 1996

UTZ Well	Total Depth	*Reference Elevation	Depth to Water	Water Level Elevation
MW-1a	19.44	47.95	8.33	39.62
MW-2	18.40	48.03	8.84	39.19
MW-3	19.93	48.55	9.31	39.24
MW-4	22.03	49.85	10.09	39.76
MW-5	27.23	49.35	9.01	40.34
MW-7	24.61	48.86	9.41	39.45
MW-8	24.91	49.37	9.51	39.86
MW-9	25.25	49.29	8.58	40.71
MW-10a	25.42	49.90	10.54	39.36
MW-11a	23.86	50.04	10.56	39.48
STZ Well/ Piezometer	**Total Depth**	***Reference Elevation**	**Depth to Water**	**Water Level Elevation**
MW-10b	46.35	49.97	10.64	39.33
MW-11b	46.56	50.19	10.83	39.36
P-10	42.74	47.72	8.34	39.38
P-11	42.64	49.02	9.15	39.87
P-12	42.77	48.82	8.12	40.70

* - All depths and elevations measured in feet; depth relative to Reference Elevation and elevation relative to Mean Sea Level
UTZ Upper Transmissive Zone
STZ Second Transmissive Zone

TABLE 4
COMPLIANCE OF WELLS AND PIEZOMETERS
WITH GROUND WATER PROTECTION STANDARD

Monitoring Point	Second Semi-annual Period	
UTZ Well	Compliant	Noncompliant
MW-1a		X
MW-2		X
MW-3		X
MW-4		X
MW-5		X
MW-7		X
MW-8	X	
MW-9	X	
MW-10a		X
MW-11a		X
STZ Well/Piezometer	Compliant	Noncompliant
MW-10b		X
MW-11b		X
P-10		X
P-11		X
P-12	X	

APPENDIX A

DESIGNATION OF WELLS BY FUNCTION

DESIGNATION OF WELLS BY FUNCTION

Designated Function*	Zone Monitored	Well Number	Sampling Frequency
Point of Compliance	UTZ	MW-1 MW-2 MW-7 MW-10a MW-11a	Semi-annual
	STZ	MW-10b MW-11b	Semi-annual
Corrective Action Observation	UTZ	MW-4 MW-5 MW-7 MW-8 MW-9	Semi-annual
	STZ	P-10 P-11 P-12	Semi-annual

* Background Wells are negated by the use of the Practical Quantitation Limit (PQL), unless the Compliance Plan is modified under CP Provision VI.A.

APPENDIX B

FIELD TRACKING REPORT AND GROUND WATER SAMPLING FORMS

PROJECT NUMBER: 44102069

PROJECT NAME: Closed Surface Impoundment, 4910 Liberty Road in Houston, Texas

FIELD TRACKING REPORT: Second Semi-annual Event 1996

FIELD SAMPLE CODE	BRIEF DESCRIPTION	DATE	TIME(S)	SAMPLER
MW-1a	Water	9-17-96	1436	Goldsby
MW-2	Water	9-17-96	1445	Goldsby
MW-3	Water	9-17-96	1450	Goldsby
MW-4	Water	9-17-96	1430	Goldsby
MW-5	Water	9-18-96	1000	Goldsby
MW-7	Water	9-18-96	0930	Goldsby
MW-8	Water	9-18-96	1045	Goldsby
MW-9	Water	9-18-96	1145	Goldsby
MW-10a	Water	9-17-96	1220	Goldsby
MW-10b	Water	9-17-96	1602	Goldsby
MW-11a	Water	9-17-96	1200	Goldsby
MW-11b	Water	9-17-96	1445	Goldsby
P-10	Water	9-18-96	1025	Goldsby
P-11	Water	9-18-96	1220	Goldsby
P-12	Water	9-18-96	1200	Goldsby

TERRANEXT
GROUND WATER SAMPLING FORM
WELL NUMBER: MW-1a

Job Name: Second Semi-annual Sampling

Job Number: 44102069

Client: Union Pacific Rail Road

Date Sampled: 9-17-96

Site Location: 4910 Liberty Rd., Houston, Texas

Time Sampled: 1436

Weather: Cloudy, 83°F

Sampled By: Goldsby/Jones (T)

EVACUATION DATA

Elevation of Measuring Point (MP):	47.95'
Depth to Water (From MP):	8.33'
Depth of Well (From MP):	19.44'
Volume of Water in Well:	6.25 gallons
Volume of Water Evacuated:	21 gallons

FIELD PARAMETERS FOLLOWING PURGING ACTIVITIES

Temp (°C):	25.4
pH:	6.66
Specific Conductivity (μmhos/cm):	1658
Purge Method:	Disposable Bailer
Sampling Method:	Disposable Bailer
Remarks:	Lab #126834

TerraNext

FIELD TESTING:
WELL ID: MW-1a
September 17, 1996

TIME	WATER PURGED (gallons)	TEMP °C	pH	SPEC COND. (μmhos/cm)
9-17-96 1327	-	27.4	6.70	1556
9-17-96 1340	7.0	24.7	6.63	1711
9-17-96 1346	14.0	25.1	6.62	1640
9-17-96 1352	21.0	25.4	6.66	1658
9-17-96 1436	21.0	25.3	6.67	1558

TERRANEXT
GROUND WATER SAMPLING FORM
WELL NUMBER: MW-2

Job Name: Second Semi-annual Sampling

Job Number: 44102069

Client: Union Pacific Rail Road

Date Sampled: 9-17-96

Site Location: 4910 Liberty Rd., Houston, Texas

Time Sampled: 1445

Weather: Cloudy, 83°F

Sampled By: Goldsby/Jones (T)

EVACUATION DATA

Elevation of Measuring Point (MP):	48.03'
Depth to Water (From MP):	8.84'
Depth of Well (From MP):	18.40'
Volume of Water in Well:	1.6 gallons
Volume of Water Evacuated:	7 gallons

FIELD PARAMETERS FOLLOWING PURGING ACTIVITIES

Temp (°C):	23.4
pH:	6.92
Specific Conductivity (μmhos/cm):	1387
Purge Method:	Disposable Bailer
Sampling Method:	Disposable Bailer
Remarks:	Lab #126836

TerraNext

FIELD TESTING:
WELL ID: MW-2
September 17, 1996

TIME	WATER PURGED (gallons)	TEMP °C	pH	SPEC COND. (μmhos/cm)
9-17-96 1340	-	25.6	7.02	497
9-17-96 1345	3.0	24.6	6.90	1000
9-17-96 1350	5.0	24.6	6.96	1139
9-17-96 1402	7.0	23.4	6.92	1387
9-17-96 1445	7.0	25.0	6.85	1552

TERRANEXT
GROUND WATER SAMPLING FORM
WELL NUMBER: MW-3

Job Name: Second Semi-annual Sampling

Job Number: 44102069

Client: Union Pacific Rail Road

Date Sampled: 9-17-96

Site Location: 4910 Liberty Rd., Houston, Texas

Time Sampled: 1450

Weather: Cloudy, 83°F

Sampled By: Goldsby/Jones (T)

EVACUATION DATA

Elevation of Measuring Point (MP):	48.55'
Depth to Water (From MP):	9.31'
Depth of Well (From MP):	19.93'
Volume of Water in Well:	1.7 gallons
Volume of Water Evacuated:	8 gallons

FIELD PARAMETERS FOLLOWING PURGING ACTIVITIES

Temp (°C):	24.1
pH:	6.78
Specific Conductivity (μmhos/cm):	1373
Purge Method:	Disposable Bailer
Sampling Method:	Disposable Bailer
Remarks:	Lab #126837

TerraNext

FIELD TESTING:
WELL ID: MW-3
September 17, 1996

TIME	WATER PURGED (gallons)	TEMP °C	pH	SPEC COND. (μmhos/cm)
9-17-96 1320	2.0	26.8	6.83	1362
9-17-96 1340	4.0	25.8	6.76	1377
9-17-96 1348	6.0	24.2	6.82	1378
9-17-96 1353	8.0	24.1	6.78	1373
9-17-96 1450	8.0	25.4	6.77	1340

TERRANEXT
GROUND WATER SAMPLING FORM
WELL NUMBER: MW-4

Job Name: Second Semi-annual Sampling

Job Number: 44102069

Client: Union Pacific Rail Road

Date Sampled: 9-17-96

Site Location: 4910 Liberty Rd., Houston, Texas

Time Sampled: 1430

Weather: Cloudy, 83°F

Sampled By: Goldsby/Jones (T)

EVACUATION DATA

Elevation of Measuring Point (MP):	49.85'
Depth to Water (From MP):	10.09'
Depth of Well (From MP):	22.03'
Volume of Water in Well:	1.9 gallons
Volume of Water Evacuated:	7.0 gallons

FIELD PARAMETERS FOLLOWING PURGING ACTIVITIES

Temp (°C):	27.3
pH:	6.81
Specific Conductivity (μmhos/cm):	919
Purge Method:	Disposable Bailer
Sampling Method:	Disposable Bailer
Remarks:	Lab #126833

TerraNext

FIELD TESTING:
WELL ID: MW-4
September 17, 1996

TIME	WATER PURGED (gallons)	TEMP °C	pH	SPEC COND. (μmhos/cm)
9-17-96 1305	1.0	27.3	6.76	851
9-17-96 1312	3.0	27.3	6.86	909
9-17-96 1320	5.0	27.4	6.82	919
9-17-96 1325	7.0	27.3	6.81	919
9-17-96 1430	7.0	26.3	6.70	921

TERRANEXT
GROUND WATER SAMPLING FORM
WELL NUMBER: MW-5

Job Name: Second Semi-annual Sampling

Job Number: 44102069

Client: Union Pacific Rail Road

Date Sampled: 9-18-96

Site Location: 4910 Liberty Rd., Houston, Texas

Time Sampled: 1000

Weather: Cloudy, 82°F

Sampled By: Goldsby/Jones (T)

EVACUATION DATA

Elevation of Measuring Point (MP):	49.35'
Depth to Water (From MP):	9.01'
Depth of Well (From MP):	27.23'
Volume of Water in Well:	2.97 gallons
Volume of Water Evacuated:	10.0 gallons

FIELD PARAMETERS FOLLOWING PURGING ACTIVITIES

Temp (°C):	24.7
pH:	6.88
Specific Conductivity (μmhos/cm):	781
Purge Method:	Disposable Bailer
Sampling Method:	Disposable Bailer
Remarks:	Lab #126840

Terranext

FIELD TESTING:
WELL ID: MW-5
September 18, 1996

TIME	WATER PURGED (gallons)	TEMP °C	pH	SPEC COND. (μmhos/cm)
9-18-96 0834	1.0	26.2	7.59	641
9-18-96 0843	3.0	25.2	6.74	754
9-18-96 0858	7.0	24.8	6.81	774
9-18-96 0908	10.0	24.7	6.88	781
9-18-96 1000	10.0	25.2	6.83	783

TERRANEXT
GROUND WATER SAMPLING FORM
WELL NUMBER: MW-7

Job Name: Second Semi-annual Sampling

Job Number: 44102069

Client: Union Pacific Rail Road

Date Sampled: 9-18-96

Site Location: 4910 Liberty Rd., Houston, Texas

Time Sampled: 0930

Weather: Cloudy, 82°F

Sampled By: Goldsby/Jones (T)

EVACUATION DATA

Elevation of Measuring Point (MP):	48.86'
Depth to Water (From MP):	9.41'
Depth of Well (From MP):	24.61'
Volume of Water in Well:	8.6 gallons
Volume of Water Evacuated:	29 gallons

FIELD PARAMETERS FOLLOWING PURGING ACTIVITIES

Temp (°C):	23.6
pH:	6.73
Specific Conductivity (μmhos/cm):	907
Purge Method:	Disposable Bailer
Sampling Method:	Disposable Bailer
Remarks:	Lab #126839

Terranext

FIELD TESTING:
WELL ID: MW-7
September 18, 1996

TIME	WATER PURGED (gallons)	TEMP °C	pH	SPEC COND. (μmhos/cm)
9-18-96 0825	1.0	25.3	7.33	760
9-18-96 0833	9.0	24.2	6.73	967
9-18-96 0848	19.0	23.4	6.73	906
9-18-96 0907	29.0	23.6	6.73	907
9-18-96 0930	29.0	24.1	6.66	906

TERRANEXT
GROUND WATER SAMPLING FORM
WELL NUMBER: MW-8

Job Name: Second Semi-annual Sampling

Job Number: 44102069

Client: Union Pacific Rail Road

Date Sampled: 9-18-96

Site Location: 4910 Liberty Rd., Houston, Texas

Time Sampled: 1045

Weather: Cloudy, 82°F

Sampled By: Goldsby/Jones (T)

EVACUATION DATA

Elevation of Measuring Point (MP):	49.37'
Depth to Water (From MP):	9.51'
Depth of Well (From MP):	24.91'
Volume of Water in Well:	8.7 gallons
Volume of Water Evacuated:	27 gallons

FIELD PARAMETERS FOLLOWING PURGING ACTIVITIES

Temp (°C):	24.1
pH:	6.66
Specific Conductivity (μmhos/cm):	1004
Purge Method:	Disposable Bailer
Sampling Method:	Disposable Bailer
Remarks:	Lab #126842

Terranext

FIELD TESTING:
WELL ID: MW-8
September 18, 1996

TIME	WATER PURGED (gallons)	TEMP °C	pH	SPEC COND. (μmhos/cm)
9-18-96 0844	-	25.2	6.82	753
9-18-96 0852	9.0	25.1	6.81	844
9-18-96 0900	18.0	24.7	6.72	973
9-18-96 0909	27.0	24.1	6.66	1004
9-18-96 1045	27.0	25.4	6.72	1030

TERRANEXT
GROUND WATER SAMPLING FORM
WELL NUMBER: MW-9

Job Name: Second Semi-annual Sampling

Job Number: 44102069

Client: Union Pacific Rail Road

Date Sampled: 9-18-96

Site Location: 4910 Liberty Rd., Houston, Texas

Time Sampled: 1145

Weather: Cloudy, 82°F

Sampled By: Goldsby/Jones (T)

EVACUATION DATA

Elevation of Measuring Point (MP):	49.29'
Depth to Water (From MP):	8.58'
Depth of Well (From MP):	25.25'
Volume of Water in Well:	10.9 gallons
Volume of Water Evacuated:	34 gallons

FIELD PARAMETERS FOLLOWING PURGING ACTIVITIES

Temp (°C):	24.4
pH:	6.66
Specific Conductivity (μmhos/cm):	800
Purge Method:	Disposable Bailer
Sampling Method:	Disposable Bailer
Remarks:	Lab #126843

Terranext

FIELD TESTING:
WELL ID: MW-9
September 18, 1996

TIME	WATER PURGED (gallons)	TEMP °C	pH	SPEC COND. (μmhos/cm)
9-18-96 1000	1.0	25.5	6.67	736
9-18-96 1012	12.0	24.9	6.64	802
9-18-96 1024	23.0	24.6	6.66	810
9-18-96 1036	34.0	24.4	6.66	800
9-18-96 1145	34.0	26.4	6.61	895

TERRANEXT
GROUND WATER SAMPLING FORM
WELL NUMBER: MW-10a

Job Name: Second Semi-annual Sampling

Job Number: 44102069

Client: Union Pacific Rail Road

Date Sampled: 9-17-96

Site Location: 4910 Liberty Rd., Houston, Texas

Time Sampled: 1220

Weather: Cloudy, 83°F

Sampled By: Goldsby/Jones (T)

EVACUATION DATA

Elevation of Measuring Point (MP):	49.90
Depth to Water (From MP):	10.54'
Depth of Well (From MP):	25.42'
Volume of Water in Well:	8.4 gallons
Volume of Water Evacuated:	25 gallons

FIELD PARAMETERS FOLLOWING PURGING ACTIVITIES

Temp (°C):	24.3
pH:	6.81
Specific Conductivity (μmhos/cm):	1758
Purge Method:	Disposable Bailer
Sampling Method:	Disposable Bailer
Remarks:	Lab #126832

Terranext

FIELD TESTING:
WELL ID: MW-10a
September 17, 1996

TIME	WATER PURGED	TEMP °C	pH	SPEC COND. (μmhos/cm)
9-17-96 1055	-	25.0	6.77	1790
9-17-96 1105	8.5	25.0	6.78	1803
9-17-96 1121	17.0	25.2	6.77	1770
9-17-96 1130	25.0	24.3	6.81	1758
9-17-96 1220	25.0	26.3	6.70	1703

TERRANEXT
GROUND WATER SAMPLING FORM
WELL NUMBER: MW-10b

Job Name: Second Semi-annual Sampling

Job Number: 44102069

Client: Union Pacific Rail Road

Date Sampled: 9-17-96

Site Location: 4910 Liberty Rd., Houston, Texas

Time Sampled: 1602

Weather: Cloudy, 83°F

Sampled By: Goldsby/Jones (T)

EVACUATION DATA

Elevation of Measuring Point (MP):	49.97'
Depth to Water (From MP):	10.64'
Depth of Well (From MP):	46.35'
Volume of Water in Well:	20.1 gallons
Volume of Water Evacuated:	60 gallons

FIELD PARAMETERS FOLLOWING PURGING ACTIVITIES

Temp (°C):	24.1
pH:	6.83
Specific Conductivity (μmhos/cm):	1605
Purge Method:	Disposable Bailer
Sampling Method:	Disposable Bailer
Remarks:	Lab #126838

Terranext

FIELD TESTING:
WELL ID: MW-10b
September 17, 1996

TIME	WATER PURGED (gallons)	TEMP °C	pH	SPEC COND. (μmhos/cm)
9-17-96 1052	1.0	26.3	6.90	1525
9-17-96 1115	20.0	23.4	6.87	1616
9-17-96 1155	40.0	23.6	6.78	1593
9-17-96 1400	60.0	24.1	6.83	1605
9-17-96 1602	60.0	24.2	6.79	1582

TERRANEXT
GROUND WATER SAMPLING FORM
WELL NUMBER: MW-11a

Job Name: Second Semi-annual Sampling

Job Number: 44102069

Client: Union Pacific Rail Road

Date Sampled: 9-17-96

Site Location: 4910 Liberty Rd., Houston, Texas

Time Sampled: 1200

Weather: Cloudy, 83°F

Sampled By: Goldsby/Jones (T)

EVACUATION DATA

Elevation of Measuring Point (MP):	50.04'
Depth to Water (From MP):	10.56'
Depth of Well (From MP):	23.86'
Volume of Water in Well:	7.5 gallons
Volume of Water Evacuated:	23 gallons

FIELD PARAMETERS FOLLOWING PURGING ACTIVITIES

Temp (°C):	24.0
pH:	6.71
Specific Conductivity (μmhos/cm):	1436
Purge Method:	Disposable Bailer
Sampling Method:	Disposable Bailer
Remarks:	Lab #126831

TerraNext

FIELD TESTING:
WELL ID: MW-11a
September 17, 1996

TIME	WATER PURGED (gallons)	TEMP °C	pH	SPEC COND. (μmhos/cm)
9-17-96 1105	1.0	24.7	6.66	1467
9-17-96 1119	7.6	25.6	6.80	1489
9-17-96 1125	15.0	25.5	6.76	1467
9-17-96 1136	23.0	24.0	6.71	1436
9-17-96 1200	23.0	25.4	6.70	1433

TERRANEXT
GROUND WATER SAMPLING FORM
WELL NUMBER: MW-11b

Job Name: Second Semi-annual Sampling

Job Number: 44102069

Client: Union Pacific Rail Road

Date Sampled: 9-17-96

Site Location: 4910 Liberty Rd., Houston, Texas

Time Sampled: 1445

Weather: Cloudy, 83°F

Sampled By: Goldsby/Jones (T)

EVACUATION DATA

Elevation of Measuring Point (MP):	50.19'
Depth to Water (From MP):	10.83'
Depth of Well (From MP):	46.56'
Volume of Water in Well:	20.1 gallons
Volume of Water Evacuated:	60 gallons

FIELD PARAMETERS FOLLOWING PURGING ACTIVITIES

Temp (°C):	25.1
pH:	6.98
Specific Conductivity (μmhos/cm):	1292
Purge Method:	Disposable Bailer
Sampling Method:	Disposable Bailer
Remarks:	Lab #126835

TerraNext

FIELD TESTING:
WELL ID: MW-11b
September 17, 1996

TIME	WATER PURGED (gallons)	TEMP °C	pH	SPEC COND. (μmhos/cm)
9-17-96 1050	2.0	25.7	6.96	1388
9-17-96 1105	20.0	23.7	6.73	1371
9-17-96 1155	40.0	23.7	7.10	1297
9-17-96 1255	60.0	25.1	6.98	1292
9-17-96 1445	60.0	26.8	6.63	1323

TERRANEXT
GROUND WATER SAMPLING FORM
PIEZOMETER NUMBER: P-10

Job Name: Second Semi-annual Sampling

Job Number: 44102069

Client: Union Pacific Rail Road

Date Sampled: 9-18-96

Site Location: 4910 Liberty Rd., Houston, Texas

Time Sampled: 1025

Weather: Cloudy, 82°F

Sampled By: Goldsby/Jones (T)

EVACUATION DATA

Elevation of Measuring Point (MP):	47.72'
Depth to Water (From MP):	8.34'
Depth of Piezometer (From MP):	42.74'
Volume of Water in Piezometer:	5.6 gallons
Volume of Water Evacuated:	19 gallons

FIELD PARAMETERS FOLLOWING PURGING ACTIVITIES

Temp (°C):	22.4
pH:	6.72
Specific Conductivity (μmhos/cm):	1143
Purge Method:	Disposable Bailer
Sampling Method:	Disposable Bailer
Remarks:	Lab #126841

TerraNext

FIELD TESTING:
PIEZOMETER ID: P-10
September 18, 1996

TIME	WATER PURGED (gallons)	TEMP °C	pH	SPEC COND. (μmhos/cm)
9-18-96 0836	1.0	25.5	7.07	1046
9-18-96 0908	7.0	22.6	6.67	1150
9-18-96 0926	13.0	23.5	6.79	1146
9-18-96 0941	19.0	22.4	6.72	1143
9-18-96 1025	19.0	23.3	6.67	1148

TERRANEXT
GROUND WATER SAMPLING FORM
PIEZOMETER NUMBER: P-11

Job Name: Second Semi-annual Sampling

Job Number: 44102069

Client: Union Pacific Rail Road

Date Sampled: 9-18-96

Site Location: 4910 Liberty Rd., Houston, Texas

Time Sampled: 1226

Weather: Cloudy, 82°F

Sampled By: Goldsby/Jones (T)

EVACUATION DATA

Elevation of Measuring Point (MP):	49.02'
Depth to Water (From MP):	9.15'
Depth of Piezometer (From MP):	42.64'
Volume of Water in Piezometer:	5.5 gallons
Volume of Water Evacuated:	18 gallons

FIELD PARAMETERS FOLLOWING PURGING ACTIVITIES

Temp (°C):	23.6
pH:	6.56
Specific Conductivity (μmhos/cm):	1424
Purge Method:	Disposable Bailer
Sampling Method:	Disposable Bailer
Remarks:	Lab #126846

Terranext

TERRANEXT
GROUND WATER SAMPLING FORM
PIEZOMETER NUMBER: P-12

Job Name: Second Semi-annual Sampling

Job Number: 44102069

Client: Union Pacific Rail Road

Date Sampled: 9-18-96

Site Location: 4910 Liberty Rd., Houston, Texas

Time Sampled: 1200

Weather: Cloudy, 82°F

Sampled By: Goldsby/Jones (T)

EVACUATION DATA

Elevation of Measuring Point (MP):	48.82'
Depth to Water (From MP):	8.12'
Depth of Piezometer (From MP):	42.77'
Volume of Water in Piezometer:	5.7 gallons
Volume of Water Evacuated:	19 gallons

FIELD PARAMETERS FOLLOWING PURGING ACTIVITIES

Temp (°C):	23.2
pH:	6.62
Specific Conductivity (μmhos/cm):	1502
Purge Method:	Disposable Bailer
Sampling Method:	Disposable Bailer
Remarks:	Lab #126845

Terranext

FIELD TESTING:
PIEZOMETER ID: P-12
September 18, 1996

TIME	WATER PURGED (gallons)	TEMP °C	pH	SPEC COND. (μmhos/cm)
9-18-96 0934	1.0	26.3	6.96	1432
9-18-96 0946	7.0	23.1	6.78	1475
9-18-96 1005	13.0	23.7	6.66	1499
9-18-96 1021	19.0	23.2	6.62	1502
9-18-96 1200	19.0	26.3	6.56	1531

TerraNext

APPENDIX C

POTENTIAL CONTAMINANTS OF CONCERN AND CONCENTRATION LIMITS FOR GROUND WATER PROTECTION STANDARD

POTENTIAL CONTAMINANTS OF CONCERN AND CONCENTRATION LIMITS FOR GROUND WATER PROTECTION STANDARD

Constituent of Concern	Detection Limits (mg/L)
Acenaphthene	ND (0.010)
Acenaphthylene	ND (0.010)
Anthracene	ND (0.010)
Benzene	ND (0.005)
Benzo(A)anthracene	ND (0.010)
Benzo(A)pyrene	ND (0.010)
Bis(2-ethylhexyl)phthalate	ND (0.010)
Bis(2-chloroethoxy)methane	ND (0.010)
Chlorobenzene	ND (0.005)
2-Chloronaphthalene	ND (0.010)
Chrysene	ND (0.010)
Dibenzofuran	ND (0.010)
1,2-Dichloroethane	ND (0.005)
Dichloromethane (Methylene chloride)	ND (0.005)
2,4-Dimethylphenol	ND (0.010)
Di-n-butyl phthalate	ND (0.010)
4,6-Dinitro-o-cresol	ND (0.050)
2,4-Dinitrotoluene	ND (0.010)
2,6-Dinitrotoluene	ND (0.010)
1,2-Diphenylhydrazine	ND (0.010)
Ethylbenzene	ND (0.005)
Fluoranthene	ND (0.010)
Fluorene	ND (0.010)
2-Methylnaphthalene	ND (0.010)
Naphthalene	ND (0.010)
Nitrobenzene	ND (0.010)
4-Nitrophenol	ND (0.050)
N-Nitrosodiphenylamine	ND (0.010)
Pentachlorophenol	ND (0.050)

POTENTIAL CONTAMINANTS OF CONCERN AND CONCENTRATION LIMITS FOR GROUND WATER PROTECTION STANDARD

Constituent of Concern	Detection Limits (mg/L)
Phenanthrene	ND (0.010)
Phenol	ND (0.010)
Pyrene	ND (0.010)
Toluene	ND (0.005)
Xylenes	ND (0.005)

ND Nondetect at Practical Quantitation Limit (PQL) as determined by the analytical methods of the EPA publication SW-846, *Test Methods for Evaluating Solid Waste*, Third Edition, November 1986, and as listed in the July 8, 1987, edition of the *Federal Register* and later editions.

APPENDIX D

COMPLIANCE PLAN SCHEDULE

COMBINED EOC/RFI SEMI-ANNUAL SCHEDULE REVISION

ID	Task Name/Permit or CP Section No.	Duration	Start	Finish	Predec	Constraint Type
1	**SCHEDULE - COMPLIANCE PLAN/ CP XI. A.**	**97d**	**6/21/94**	**11/3/94**		**As Soon As Possible**
4						
5	**OPERATION & MAINTENANCE PLAN/ CP XI. B.**	**145d**	**6/21/94**	**1/10/95**		**As Soon As Possible**
6	Submit to TNRCC	60ed	6/21/94	8/20/94		Must Finish On
7	TNRCC Review Period	73ed	8/22/94	11/3/94	6	As Soon As Possible
8	Revise O&M Plan	43ed	11/3/94	12/16/94	7	Must Finish On
9	Submit to TNRCC	0ed	12/16/94	12/16/94	8	Must Start On
10	TNRCC Review & Approval	17d	12/19/94	1/10/95	9	Must Finish On
11						
12	**P.O.C. WELL INSTALLATION/ CP XI. C.**	**104d**	**7/22/94**	**12/14/94**		**As Soon As Possible**
13	Notify TNRCC - 30 day advance	3d	7/22/94	7/26/94		Must Finish On
14	Install P.O.C. Wells	7d	9/12/94	9/20/94	13	Must Start On
15	Develop and Sample Wells	4d	9/21/94	9/26/94	14	As Soon As Possible
16	Submit Data Report to TNRCC	57d	9/27/94	12/14/94	15	Must Finish On
17						
18						
19	**EXTENT OF CONTAMINATION WORK PLAN/ VIII & XI. D.**	**335d**	**6/20/94**	**9/29/95**		**As Soon As Possible**
20	Submit to TNRCC	67d	6/20/94	9/20/94		Must Finish On
21	TNRCC Review Period	111ed	9/21/94	1/10/95	20	As Soon As Possible
22	Revise EOC Work Plan	45ed	1/10/95	2/24/95	21	Must Finish On
23	Submit to TNRCC	0ed	2/24/95	2/24/95	22	Must Finish On
24	TNRCC Review Period	45ed	2/27/95	4/13/95	23	As Soon As Possible
25	Revise EOC Work Plan	30ed	4/13/95	5/13/95	24	As Soon As Possible
26	Submit to TNRCC	5ed	5/14/95	5/19/95	25	Must Finish On
27	TNRCC Approval	130ed	5/22/95	9/29/95	26	Must Finish On
28						
29	**RFI WORK PLAN DEVELOPMENT/ Permit VIII.**	**347d**	**6/20/94**	**10/17/95**		**As Soon As Possible**
30	Submit to TNRCC	87d	6/20/94	10/18/94		Must Finish On
31	TNRCC Review Period	362ed	10/19/94	10/16/95	30	Must Finish On
32	TNRCC Approval	1d	10/17/95	10/17/95	31	As Soon As Possible
33						
34						
35	**EOC IMPLEMENTATION - PHASE I/ CP VIII.**	**288d**	**11/9/94**	**12/15/95**		**As Soon As Possible**
36	Wetlands Assessment & Report Preparation	145d	11/9/94	5/30/95		Must Finish On
37	COE/TNRCC Approval & Access Authorization	60ed	5/31/95	7/30/95	36	As Soon As Possible
38	Initiation/Preparation for EOC Investigation	12ed	11/2/95	11/14/95	27	Must Finish On
39	CPT Soundings w/ROST real-time data	9d	11/14/95	11/24/95	38	Must Start On
40	Hydropunch Sampling & Analyses	11d	11/27/95	12/11/95	39	As Soon As Possible
41	Survey Sample Locations	4d	12/12/95	12/15/95	40	As Soon As Possible
42						
43	**RFI IMPLEMENTATION - PHASE 1/ Permit VIII.E.**	**27d**	**11/16/95**	**12/22/95**		**As Soon As Possible**
44	CPT Soundings w/ROST real-time data	7d	11/16/95	11/24/95		Must Start On
45	Hydropunch Sampling & Analyses	18d	11/29/95	12/22/95	44	Must Start On
46	Surface Soil & Sediment Sampling & Analyses	15d	12/4/95	12/22/95	44	Must Start On
47	Survey Sample Locations	4d	12/12/95	12/15/95	40	As Soon As Possible
48						
49						
50	**RFI/EOC PHASE 1 INVESTIGATION REPORT**	**284d**	**12/18/95**	**1/16/97**		**As Soon As Possible**
51	Submit Phase 1 Assessment Report to TNRCC	115d	12/18/95	5/24/96	47	As Soon As Possible
52	TNRCC Review of Phase I Report	131d	5/27/96	11/25/96	51	As Soon As Possible
53	TNRCC Approval of Phase 2 Scope of Work - EOC	1d	11/26/96	11/26/96	52	As Soon As Possible
54	TNRCC Approval of Phase 2 Scope of Work - RFI	169d	5/27/96	1/16/97	51	As Soon As Possible
55						
56						
57	**EOC & RFI IMPLEMENTATION - PHASE 2/ CP VIII/P.VIII.E.**	**104d**	**1/17/97**	**6/12/97**		**As Soon As Possible**
58	Off-site access and permitting	30ed	1/17/97	2/16/97	54	As Soon As Possible
59	Hydropunch, Soil Borings & Soil Samples	15ed	2/17/97	3/4/97	58	As Soon As Possible
60	Groundwater Monitor Well Installation	20ed	3/4/97	3/24/97	59	As Soon As Possible
61	Monitoring Well Development	4ed	3/24/97	3/28/97	60	As Soon As Possible
62	Monitoring Well Sampling - 1st Event	3d	3/28/97	4/1/97	61	As Soon As Possible
63	Slug Tests	3d	4/2/97	4/4/97	62	As Soon As Possible
64	Survey Monitoring Wells	1d	4/7/97	4/7/97	63	As Soon As Possible
65	Data Evaluation	25d	4/8/97	5/12/97	64	As Soon As Possible
66	30-day Follow-up Sampling (if necessary)	30ed	5/13/97	6/12/97	65	As Soon As Possible
67						
68						

COMBINED EOC/RFI SEMI-ANNUAL SCHEDULE REVISION

ID	Task Name/Permit or CP Section No.	Duration	Start	Finish	Predec	Constraint Type
69	**RFI/EOC PHASE 2 REPORT DEVELOPMENT/ VIII.I./VIII. E.**	**260d**	**1/17/97**	**1/15/98**		**As Soon As Possible**
70	Submit Draft Phase 2 RFI/EOC Report to TNRCC	150d	1/17/97	8/14/97	54	Must Finish On
71	TNRCC Review of Report	90ed	8/15/97	11/13/97	70	As Soon As Possible
72	Respond to TNRCC Comments	30ed	11/13/97	12/13/97	71	As Soon As Possible
73	Submit (Final) Phase 2 Report to TNRCC	1d	12/15/97	12/15/97	72	As Soon As Possible
74	TNRCC Review	30ed	12/16/97	1/15/98	73	As Soon As Possible
75	TNRCC Approval	1d	1/15/98	1/15/98	74	As Soon As Possible
76						
77						
78	**(EOC) CA STUDY WORK PLAN/ CP IX.**	**133d**	**10/28/97**	**4/30/98**		**As Soon As Possible**
79	Prepare and Submit CA Study Work Plan	60ed	10/28/97	12/27/97	75	Must Finish On
80	TNRCC Review of Draft Work Plan	60ed	12/29/97	2/27/98	79	As Soon As Possible
81	Revise per TNRCC Review	30ed	2/27/98	3/29/98	80	As Soon As Possible
82	Submit Revised CA Work Plan to TNRCC	1ed	3/30/98	3/31/98	81	As Soon As Possible
83	TNRCC Review	30ed	3/31/98	4/30/98	82	As Soon As Possible
84	TNRCC Approval	1d	4/30/98	4/30/98	83	As Soon As Possible
85						
86						
87	**(EOC) CORRECTIVE ACTION REPORT/ CP IX.E.**	**303d**	**5/1/98**	**6/29/99**		**As Soon As Possible**
88	Pilot Studies/Field Tests	180ed	5/1/98	10/28/98	84	As Soon As Possible
89	Submit CA Report to TNRCC	120ed	10/28/98	2/25/99	88	As Soon As Possible
90	TNRCC Review of Draft Report	60ed	2/25/99	4/26/99	89	As Soon As Possible
91	Revise per TNRCC Review	30ed	4/26/99	5/26/99	90	As Soon As Possible
92	Submit Final CA Report to TNRCC	1ed	5/26/99	5/27/99	91	As Soon As Possible
93	TNRCC Review	30ed	5/27/99	6/26/99	92	As Soon As Possible
94	TNRCC Approval	2d	6/28/99	6/29/99	93	As Soon As Possible
95						
96	**(RFI) CORRECTIVE MEASURES STUDY/ Permit VIII.I.3.**	**361d**	**1/27/97**	**6/16/98**		**As Soon As Possible**
97	Submit CMS with RFI Report (Option 1 - 120 days)	120ed	1/27/97	5/27/97	66	Must Finish On
98	TNRCC Review	90ed	5/27/97	8/25/97	97	As Soon As Possible
99	TNRCC Approval of RFI & CMS Report combined	1ed	8/25/97	8/26/97	98	As Soon As Possible
100						
101	Submit CMS separate from RFI Report (Option 2)	60ed	1/16/98	3/17/98	75	As Soon As Possible
102	TNRCC Review	90ed	3/17/98	6/15/98	101	As Soon As Possible
103	TNRCC Approval of CMS Report	1ed	6/15/98	6/16/98	102	As Soon As Possible
104						
105						
106	**CA IMPLEMENTATION/ X.**	**268d**	**1/5/99**	**1/16/00**		**As Soon As Possible**
107	Submit Engineering Plans as Permit Modification	90ed	1/5/99	4/5/99	94	Must Finish On
108	TNRCC Review of Plans	30ed	4/6/99	5/6/99	107	As Soon As Possible
109	Final Submission of Engineering Plans & Specs.	90ed	5/6/99	8/4/99	108	As Soon As Possible
110	TNRCC Review & Approval	30ed	8/4/99	9/3/99	109	As Soon As Possible
111	Construction/Installation	90ed	9/3/99	12/2/99	110	As Soon As Possible
112	System Start-up/Initial Operation/Permit Mon.	45ed	12/2/99	1/16/00	111	As Soon As Possible
113						
114	**RFI/CMS CORRECTIVE ACTION**	300ed	9/3/99	6/29/00	110	As Soon As Possible
115						
116						
117	**GROUND WATER MONITORING/ VI. & Permit VII.B.**	**912d**	**6/20/94**	**12/17/97**		**As Soon As Possible**
118						
119	Sample Existing & POC Wells	2ed	1/24/95	1/26/95		Must Start On
120	Report Submittal	58ed	1/26/95	3/25/95	119	As Soon As Possible
121						
122	Sample Existing & POC Wells	2ed	4/12/95	4/14/95		Must Start On
123	Report Submittal (2nd Qtr. 1995)	55ed	4/14/95	6/8/95	122	Must Finish On
124						
125	Sample Existing & POC Wells	2ed	7/11/95	7/13/95		Must Start On
126	Report Submittal (3rd Qtr. 1995)	25ed	7/14/95	8/8/95	125	Must Finish On
127						
128	Sample Existing & POC Wells	6ed	1/22/96	1/28/96		Start No Earlier Than
129	Report Submittal (1st semi-annual monitoring)	53ed	1/29/96	3/22/96	128	As Soon As Possible
130						
131	Sample Existing & POC Wells	6ed	9/16/96	9/22/96		Start No Earlier Than
132	Report Submittal (2nd semi-annual monitoring)	86d	9/23/96	1/20/97	131	Must Finish On
133						

COMBINED EOC/RFI SEMI-ANNUAL SCHEDULE REVISION

ID	Task Name/Permit or CP Section No.	Duration	Start	Finish	Predec	Constraint Type
134	Sample Existing, POC and RFI Wells & Analyze	6ed	3/28/97	4/3/97		Start No Earlier Than
135	Report Submittal (1st Semi-annual monitoring 1997)	82d	3/27/97	7/18/97	134	Must Finish On
136						
137	Sample EOC & RFI Wells	30ed	4/28/97	5/28/97		Start No Earlier Than
138						
139	Sample Existing, POC, and RFI Wells	6ed	9/15/97	9/21/97		Start No Earlier Than
140						
141	Sample EOC & RFI Wells	30ed	11/17/97	12/17/97		Start No Earlier Than
142						
143	**REPORTING 1997/1998**	1d	6/20/94	6/20/94		As Soon As Possible
144	**Semi-annual Report - January 21, 1997/ VII. B.2.**	**42d**	**11/21/96**	**1/20/97**		**As Soon As Possible**
145	Submit Report to TNRCC	60ed	11/21/96	1/20/97		Finish No Earlier Than
146						
147	**Annual Report - January 25, 1997 (Permit V.F. & III.B.1)**	**44d**	**11/25/96**	**1/24/97**		**As Soon As Possible**
148	Submit Report to TNRCC	60ed	11/25/96	1/24/97		Finish No Earlier Than
149						
150	**Semi-annual Report - July 21, 1997/ VII. B.2.**	**129d**	**1/23/96**	**7/20/96**		**As Soon As Possible**
151	Submit Report to TNRCC	129d	1/23/96	7/20/96		Must Finish On
152						
153	**Semi-annual Report - January 21, 1998/VII.B.2.**	**60d**	**10/29/97**	**1/20/98**		**As Soon As Possible**
154	Submit Report to TNRCC	60d	10/29/97	1/20/98		Must Finish On
155						
156	**Annual Report - January 25, 1998 (Permit V.F. & III.B.1)**	**60d**	**11/3/97**	**1/23/98**		**As Soon As Possible**
157	Submit Report to TNRCC	60d	11/3/97	1/23/98		Must Finish On
158						
159	**Semi-annual Report - July 21, 1998/VII.B.2.**	**127d**	**1/22/98**	**7/17/98**		**As Soon As Possible**
160	Submit Report to TNRCC	127d	1/22/98	7/17/98		Must Finish On

APPENDIX E

INDICATOR PARAMETERS AND CONCENTRATION LIMITS FOR GROUND WATER PROTECTION STANDARD

INDICATOR PARAMETERS AND CONCENTRATION LIMITS FOR GROUND WATER PROTECTION STANDARD

Indicator Parameter	Detection Limits (mg/L)
Acenaphthene	ND (0.010)
Anthracene	ND (0.010)
Benzene	ND (0.005)
Bis(2-ethylhexyl)phthalate	ND (0.010)
Dibenzofuran	ND (0.010)
Dichloromethane (Methylene chloride)	ND (0.005)
2,4-Dimethylphenol	ND (0.010)
4,6-Dinitro-o-cresol	ND (0.050)
Ethylbenzene	ND (0.005)
Fluoranthene	ND (0.010)
Fluorene	ND (0.010)
2-Methylnaphthalene	ND (0.010)
Naphthalene	ND (0.010)
Phenanthrene	ND (0.010)
Pyrene	ND (0.010)
Toluene	ND (0.005)
Xylenes	ND (0.005)

ND Nondetect at Practical Quantitation Limit (PQL) as determined by the analytical methods of the EPA publication SW-846, *Test Methods for Evaluating Solid Waste*, Third Edition, November 1986, and as listed in the July 8, 1987, edition of the *Federal Register* and later editions.